

WHAT IS CLAIMED IS:

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1. An immunological, immunogenic or vaccine composition for the prevention and/or treatment of porcine circovirus-2 (PCV-2)-caused myocarditis, and/or abortion and/or intrauterine infection and/or post-weaning multisystemic wasting syndrome and/or other pathologic sequelae associated with PCV-2 comprising a pharmaceutically or veterinarily or medically acceptable carrier and an active agent comprising a PCV-2 immunogen, or a polypeptide comprising an epitope of a PCV-2 immunogen, or an antibody elicited by a PCV-2 immunogen, or an antibody elicited by an epitope of a PCV-2 immunogen, or a vector expressing a PCV-2 immunogen, or a vector expressing an epitope of a PCV-2 immunogen, or a PCV-1 immunogen that also binds to an antibody elicited by a PCV-2 immunogen or epitope, or a polypeptide comprising an epitope of a PCV-1 immunogen that also binds to an antibody elicited by a PCV-2 immunogen or epitope, or an antibody elicited by a PCV-1 immunogen that binds with both a PCV-1 immunogen or epitope and a PCV-2 epitope or immunogen, or an antibody elicited by an epitope of a PCV-1 immunogen that binds with both a PCV-1 immunogen or epitope and a PCV-2 epitope or immunogen, or a vector expressing a PCV-1 immunogen that also binds to an antibody elicited by a PCV-2 immunogen or epitope, or a vector expressing an epitope of a PCV-1 immunogen that also binds to an antibody elicited by a PCV-2 immunogen or epitope.

2. The composition of claim 1 for the prevention of PCV-2-caused myocarditis and/or abortion and/or intrauterine infection comprising a pharmaceutically or veterinarily or medically acceptable carrier and an active agent comprising a PCV-2 immunogen or a polypeptide comprising an epitope of a PCV-2 immunogen or an antibody elicited by a PCV-2 immunogen or an antibody elicited by an epitope of a PCV-2 immunogen or a vector expressing a PCV-2 immunogen or a vector expressing an epitope of a PCV-2 immunogen.

3. ~~The composition of claim 2 wherein the composition comprises a PCV-2 immunogen.~~

~~4. The composition of claim 2 wherein the composition comprises a polypeptide comprising an epitope of a PCV-2 immunogen.~~

~~5. The composition of claim 2 wherein the composition comprises an antibody elicited by a PCV-2 immunogen.~~

~~6. The composition of claim 2 wherein the composition comprises an antibody elicited by an epitope of a PCV-2 immunogen.~~

~~7. The composition of claim 2 wherein the composition comprises a vector expressing a PCV-2 immunogen.~~

~~8. The composition of claim 2 wherein the composition comprises a vector expressing an epitope of a PCV-2 immunogen.~~

9. The composition of claim 3 wherein the PCV-2 immunogen is a porcine circovirus.

10. The composition of claim 9 wherein the PCV-2 immunogen comprises attenuated live whole PCV-2.

11. The composition of claim 9 wherein the PCV-2 immunogen comprises inactivated PCV-2.

~~12. The composition of claim 3 wherein the composition is a subunit immunogenic, immunological or vaccine composition.~~

13. The composition of claim 3 additionally including at least one immunogen or epitope from at least one additional pig pathogen or a vector expressing such an immunogen or epitope.

14. The composition of claim 13 wherein the composition additionally includes at least one antigen immunogen or epitope from at least one additional pig pathogen.

15. The composition of claim 13 wherein the at least one additional pig pathogen is selected from the group consisting of PRRS, Mycoplasma hyopneumoniae, Actinobacillus pleuropneumoniae, *E. coli*, Atrophic Rhinitis, Pseudorabies, Hog cholera, Swine Influenza, encephalomyocarditis virus, and PPV.

16. The composition of claim 13 wherein the at least one additional pig pathogen comprises PPV.

17. The composition of claim 7 wherein the vector comprises a DNA vector plasmid, a *E. coli*, a baculovirus, a pig herpes viruses, including Aujeszky's disease virus, a porcine adenovirus, a poxvirus, including a vaccinia virus, an avipox virus, a canarypox virus, and a swinepox virus.

18. The composition of claim 17 wherein the vector comprises a DNA vector.

19. The composition of claim 17 wherein the vector comprises a canarypox virus.

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20. The composition of claim 7 additionally including at least one immunogen or epitope from at least one additional pig pathogen, or a vector expressing such an immunogen or epitope, wherein the vector can also be the vector expressing the PCV-2 immunogen or epitope.

21. The composition of claim 17 additionally including at least one immunogen or epitope from at least one additional pig pathogen, or a vector expressing such an immunogen or epitope, wherein the vector can also be the vector expressing the PCV-2 immunogen n or epitope.

22. The composition of claim 20 wherein the at least one additional pig pathogen is selected from the group consisting of PRRS, Mycoplasma hyopneumoniae, Actinobacillus pleuropneumoniae, *E. coli*, Atrophic Rhinitis, Pseudorabies, Hog cholera, Swine Influenza, encephalomyocarditis virus, and PPV.

23. The composition of claim 21 wherein the at least one additional pig pathogen is selected from the group consisting of PRRS, Mycoplasma hyopneumoniae, Actinobacillus pleuropneumoniae, *E. coli*, Atrophic Rhinitis, Pseudorabies, Hog cholera, Swine Influenza, encephalomyocarditis virus, and PPV.

24. The composition of claim 7 wherein the vector contains and expresses an ORF selected from the group consisting of ORFs 1 to 13.

25. The composition of claim 17 wherein the vector contains and expresses an ORF selected from the group consisting of ORFs 1 to 13.

26. The composition of claim 24 wherein the vector contains and expresses an ORF selected from ORFs 4, 7, 10 and 13

27. The composition of claim 25 wherein the vector contains and expresses an ORF selected from ORFs 4, 7, 10 and 13

28. The composition of claim 24 wherein the vector contains and expresses ORF 4 and/or 13

29. The composition of claim 24 wherein the vector contains and expresses ORF 4 and/or 13

30. The composition of claim 3 wherein the immunogen or epitope is recombinantly produced.

31. A method for the prevention and/or treatment of porcine circovirus-2 (PCV-2)-caused myocarditis, and/or abortion and/or intrauterine infection and/or post weaning

multisystemic wasting syndrome and/or other pathologic sequelae associated with PCV-2 comprising a inducing an immunological, immunogenic or protective response against PCV-2 in a pig comprising administering to the pig a composition comprising a pharmaceutically or veterinarily or medically acceptable carrier and an active agent comprising a PCV-2 immunogen, or a polypeptide comprising an epitope of a PCV-2 immunogen, or an antibody elicited by a PCV-2 immunogen, or an antibody elicited by an epitope of a PCV-2 immunogen, or a vector expressing a PCV-2 immunogen, or a vector expressing an epitope of a PCV-2 immunogen, or a PCV-1 immunogen that also binds to an antibody elicited by a PCV-2 immunogen or epitope, or a polypeptide comprising an epitope of a PCV-1 immunogen that also binds to an antibody elicited by a PCV-2 immunogen or epitope, or an antibody elicited by a PCV-1 immunogen that binds with both a PCV-1 immunogen or epitope and a PCV-2 epitope or immunogen, or an antibody elicited by an epitope of a PCV-1 immunogen that binds with both a PCV-1 immunogen or epitope and a PCV-2 epitope or immunogen, or a vector expressing a PCV-1 immunogen that also binds to an antibody elicited by a PCV-2 immunogen or epitope, or a vector expressing an epitope of a PCV-1 immunogen that also binds to an antibody elicited by a PCV-2 immunogen or epitope.

32. The method of claim 31 for the prevention of PCV-2-caused myocarditis and/or abortion and/or intrauterine infection comprising administering a composition comprising a pharmaceutically or veterinarily or medically acceptable carrier and an active agent comprising a PCV-2 immunogen or a polypeptide comprising an epitope of a PCV-2 immunogen or an antibody elicited by a PCV-2 immunogen or an antibody elicited by an epitope of a PCV-2 immunogen or a vector expressing a PCV-2 immunogen or a vector expressing an epitope of a PCV-2 immunogen.

33. The method of claim 32 wherein the composition comprises a PCV-2 immunogen.

~~34. The method of claim 32 wherein the composition comprises a polypeptide comprising an epitope of a PCV-2 immunogen.~~

35. The method of claim 32 wherein the composition comprises an antibody elicited by a PCV-2 immunogen.

~~36. The method of claim 32 wherein the composition comprises an antibody elicited by an epitope of a PCV-2 immunogen.~~

37. The method of claim 32 wherein the composition comprises a vector expressing a PCV-2 immunogen.

38. The method of claim 32 wherein the composition comprises a vector expressing an epitope of a PCV-2 immunogen.

39. The method of claim 33 wherein the PCV-2 immunogen is a porcine circovirus.

40. The method of claim 39 wherein the PCV-2 immunogen comprises attenuated live whole PCV-2.

41. The method of claim 39 wherein the PCV-2 immunogen comprises inactivated PCV-2.

~~42. The method of claim 33 wherein the composition is a subunit immunogenic, immunological or vaccine composition.~~

43. The method of claim 33 wherein the composition additionally includes at least one immunogen or epitope from at least one additional pig pathogen or a vector expressing such an immunogen or epitope.

44. The method of claim 43 wherein the composition additionally includes at least one immunogen or epitope from at least one additional pig pathogen.

45. The method of claim 43 wherein the at least one additional pig pathogen is selected from the group consisting of PRRS, Mycoplasma hyopneumoniae, Actinobacillus pleuropneumoniae, *E. coli*, Atrophic Rhinitis, Pseudorabies, Hog cholera, Swine Influenza, encephalomyocarditis virus, and PPV.

46. The method of claim 43 wherein the at least one additional pig pathogen comprises PPV.

47. The method of claim 37 wherein the vector comprises a DNA vector plasmid, a *E. coli*, a baculovirus, a pig herpes viruses, including Aujeszky's disease virus, a porcine adenovirus, a poxvirus, including a vaccinia virus, an avipox virus, a canarypox virus, and a swinepox virus.

48. The method of claim 47 wherein the vector comprises a DNA vector.

49. The method of claim 47 wherein the vector comprises a canarypox virus.

50. The method of claim 37 additionally including at least one immunogen or epitope from at least one additional pig pathogen, or a vector expressing such an immunogen or epitope, wherein the vector can also be the vector expressing the PCV-2 immunogen or epitope.

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51. The method of claim 47 additionally including at least one immunogen or epitope from at least one additional pig pathogen, or a vector expressing such an immunogen or epitope, wherein the vector can also be the vector expressing the PCV-2 immunogen or epitope.

52. The method of claim 50 wherein the at least one additional pig pathogen is selected from the group consisting of PRRS, Mycoplasma hyopneumoniae, Actinobacillus pleuropneumoniae, *E. coli*, Atrophic Rhinitis, Pseudorabies, Hog cholera, Swine Influenza, encephalomyocarditis virus, and PPV.

53. The method of claim 51 wherein the at least one additional pig pathogen is selected from the group consisting of PRRS, Mycoplasma hyopneumoniae, Actinobacillus pleuropneumoniae, *E. coli*, Atrophic Rhinitis, Pseudorabies, Hog cholera, Swine Influenza, and PPV.

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54. The method of claim 37 wherein the vector contains and expresses an ORF selected from the group consisting of ORFs 1 to 13.

55. The composition of claim 47 wherein the vector contains and expresses an ORF selected from the group consisting of ORFs 1 to 13.

56. The method of claim 54 wherein the vector contains and expresses an ORF selected from ORFs 4, 7, 10 and 13

57. The method of claim 55 wherein the vector contains and expresses an ORF selected from ORFs 4, 7, 10 and 13

58. The method of claim 54 wherein the vector contains and expresses ORF 4 and/or 13

59. The method of claim 55 wherein the vector contains and expresses ORF 4 and/or 13

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60. The method of claim 33 wherein the immunogen or epitope is recombinantly produced.

61. The method of claim 32 wherein the pig is a female pig.

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62. The method of claim 61 wherein the administering is prior to breeding.

63. The method of claim 61 wherein the administering is during pregnancy.

64. The method of claim 32 wherein the pig is a male pig.

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65. A method for preparing the composition of claim 1 comprising admixing the pharmaceutically or veterinarily or medically acceptable carrier and the active agent comprising

a PCV-2 immunogen, or a polypeptide comprising an epitope of a PCV-2 immunogen, or an antibody elicited by a PCV-2 immunogen, or an antibody elicited by an epitope of a PCV-2 immunogen, or a vector expressing a PCV-2 immunogen, or a vector expressing an epitope of a PCV-2 immunogen, or a PCV-1 immunogen that also binds to an antibody elicited by a PCV-2 immunogen or epitope, or a polypeptide comprising an epitope of a PCV-1 immunogen that also binds to an antibody elicited by a PCV-2 immunogen or epitope, or an antibody elicited by a PCV-1 immunogen that binds with both a PCV-1 immunogen or epitope and a PCV-2 epitope or immunogen, or an antibody elicited by an epitope of a PCV-1 immunogen that binds with both a PCV-1 immunogen or epitope and a PCV-2 epitope or immunogen, or a vector expressing a PCV-1 immunogen that also binds to an antibody elicited by a PCV-2 ant immunogen igen or epitope, or a vector expressing an epitope of a PCV-1 immunogen that also binds to an antibody elicited by a PCV-2 immunogen or epitope.

66. A kit for preparing the composition of claim 1 or for performing the method of claim 31 comprising in a first container the pharmaceutically or veterinarily or medically acceptable carrier and in a second container the active agent comprising a PCV-2 immunogen, or a polypeptide comprising an epitope of a PCV-2 immunogen, or an antibody elicited by a PCV-2 immunogen, or an antibody elicited by an epitope of a PCV-2 immunogen, or a vector expressing a PCV-2 immunogen, or a vector expressing an epitope of a PCV-2 immunogen, or a PCV-1 immunogen that also binds to an antibody elicited by a PCV-2 immunogen or epitope, or a polypeptide comprising an epitope of a PCV-1 immunogen that binds to an antibody elicited by a PCV-2 immunogen or epitope, or an antibody elicited by a PCV-1 immunogen that binds with both a PCV-1 immunogen or epitope and a PCV-2 epitope or immunogen, or an antibody elicited by an epitope of a PCV-1 immunogen that binds with both a PCV-1 immunogen or epitope and a PCV-2 epitope or immunogen, or a vector expressing a PCV-1 immunogen that also binds to an antibody elicited by a PCV-2 immunogen or epitope, or a vector expressing an epitope of a PCV-1 immunogen that also binds to an antibody elicited by a PCV-2 immunogen or epitope; wherein the first and second containers are optionally packaged together, and the kit optionally includes instructions for admixture of ingredients of the composition and/or administration of the composition.

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67. An isolated nucleic acid molecule comprising a sequence of the genome of 1103 strain or 1121 strain or a fragment thereof comprising an open reading frame or encoding an epitope or immunogen.
68. A vector comprising the isolated nucleic acid molecule of claim 67.
69. A PCV-2 immunogen or epitope from expression of the nucleic acid molecule of claim 67.
70. An immunological composition comprising the DNA molecule of claim 67.
71. An immunological composition comprising the immunogen or epitope of claim 69.
72. A method for inducing an immunological response comprising administering the vector of claim 68 wherein there is in vivo expression of the nucleic acid molecule.
73. A method for inducing an immunological response comprising administering the immunological composition of claim 70, wherein there is in vivo expression of the nucleic acid molecule.
74. A method for inducing an immunological response comprising administering the immunogen or epitope of claim 69.
75. A method for inducing an immunological response comprising administering the immunological composition of claim 71.
76. A PCV-2 immunogen or epitope from expression of the vector of claim 68.
77. An immunological composition comprising the immunogen or epitope of claim 76.
78. A method for inducing an immunological response comprising administering the immunogen or epitope of claim 76.
79. A method for inducing an immunological response comprising administering the immunological composition of claim 77.
80. An immunological composition comprising the vector of claim 68.
81. A method for inducing an immunological response comprising administering the immunological composition of claim 80, wherein there is in vivo expression of the nucleic acid molecule.

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